

## War Section.

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### Diet and Disease in the Navy.

By Surgeon Commander C. H. DAWE, R.N.

IN dealing with the effects of any particular trade or calling on the health of the members of that community, we are at once faced with the difficulty of obtaining a satisfactory standard for comparison, such as the incidence of disease in the civil population. With the exception of tuberculosis, the Registrar-General's official figures are mortality rates. In the Services, we are more concerned with the case rates than mortality rates, and we have special populations with regard to selected men and age-groups. In England and Wales we have the male population, at each age-group, decreasing roughly with increasing ages, whereas, in the Navy with a population aged 15 to 45, we have, compared with the civil population, a high percentage of men aged 20 to 30, and a low percentage below 20, and above 30 years of age. With these difficulties, it becomes most practicable to compare the health of a service with what it was years ago, and to compare it with other services working under different conditions.

In the past forty years the general conditions of living in the Navy have vastly changed, the changes being probably more marked than in any other community.

Briefly stated, the changes consist of, (a) much improved diet, (b) more comfort, (c) less physical energy expended per man per diem, three factors which are intimately concerned in the nutrition and resistance of the body to infection, and in general metabolism.

In the Army it would appear that with men living ashore in barracks and married quarters fresh food has been more easily obtained than afloat, and as drilling in the open air is part of a soldier's daily work, the changes in nutrition and metabolism have probably not so greatly changed in the past forty years as in the Navy. Similarly, in the Air Force, we have a body of men living ashore and working in the open air mostly, factors which should result in a low sick rate.

In the early 'eighties, the Navy consisted of small steamships with small complements. At sea full use was made of sails, and masts and yards demanded much physical energy. Boat-pulling was a necessity, and the percentage of men employed below decks was small. Men spent a large part of their time in the open air and sun. Below decks, the cubic capacity was small and ventilation bad, stoves and steam fans being used to improve the air conditions.

The standard ration included 1 lb. of fresh meat and  $\frac{1}{2}$  lb. fresh vegetables when procurable. At sea, however, salt meat was the ration, salt pork and split peas every other day, salt beef with flour, suet and raisins one day, and preserved meat with rice and preserved potatoes on the other day. No flour was carried for bread making, so  $1\frac{1}{4}$  lb. ships biscuit was issued daily at sea, soaked in water to make it soft and eatable. Oatmeal, sugar, tea, cocoa, and condiments completed the ration, which worked out at about 4,500 calories per diem. Bread of varying qualities was purchased locally. Rum and lime juice were available then as at the present time.

It should be noted that men had no option in this diet, i.e., they could not omit part of it and take up money in lieu. Canteens existed in the big ships only, so the majority of men lived practically on the standard ration, and I understand enjoyed healthy appetites. Cooking arrangements were primitive. An able seaman's pay was 1s. 8d. per day. It should also be remembered that commissions in those days lasted from three and a half to five and a half years, giving plenty of time for any ill-effects of the ration to show themselves. Considering the work done the calories were not excessive. There were plenty of fat and protein and much roughage in the carbohydrates, peas and raisins, but the diet was ill-balanced owing to the lack of fresh vegetable, and the food was monotonous.

According to McCarrison, the functional perfection of the gastro-intestinal tract is dependent largely on the adequate provision of vitamins, and salts in fresh vegetable foods. Lack of them produced impaired vitality of the tracts in animals, together with invasion of the mucous membrane and blood-vessels of the bowel by micro-organisms and ulceration of the duodenum and stomach.

Regarding the body as a transformer of energy, the digestive tract is responsible for the assimilation of most of the energy, and the skin gets rid of most of that energy in the form of heat. The integrity of these two great surfaces is therefore most important in the well-being of the body and depends primarily on nutrition.

TABLE I.—RATE PER 1,000 PER ANNUM.

	1882	1910	1923
Total sick rates ... ..	1,148	653	559
Injuries ... ..	240	140	96
Sickness only ... ..	908	513	463
Skin and cutaneous ... ..	272	76	62
Boils, ulcers, abscesses ... ..	80 per cent.	—	50 per cent.
Digestive system ... ..	150	100	75
Sore throat ... ..	25	50	30
Disease of stomach ... ..	25	10	10
Disease of intestines ... ..	60	30	20
Other diseases of the digestive system ... ..	41	10	15

In Table I are compared the sickness rates in the Navy forty-four years and sixteen years ago and the present time. It will be seen that in the 'eighties roughly one-third of the sickness, accidents excluded, was due to skin trouble, 80 per cent. of which were boils, ulcers and abscesses, and one-sixth of sickness due to digestive system troubles. That is, 50 per cent. of the sickness was due to skin and digestive tract troubles.

Dyspepsia, diarrhoea, colic, etc., were the most common forms of sickness. The other diseases of the digestive system were largely due to dysentery and liver abscesses. I suggest that in those days nutrition was at fault, and when the men were exposed to the heat and humidity of a warm climate, infection readily occurred, with lowered resistance of the skin and digestive tract. The entamoeba readily gained a foothold and produced its sequelæ, causing the greatest number of deaths from diseases of the digestive system.

Comparing the figures of 1882 with those of 1923, the "sickness only" rate is halved, and roughly 60 per cent. of this fall is due to the improved rates in skin and digestive system. The "skin rate" has fallen from 272 per 1,000 to 62, and only 50 per cent. now is due to boils, ulcers and abscesses. Digestive system troubles are halved, but now new troubles, such as appendicitis and peptic ulcers have arisen.

At the beginning of the century ships were bigger, and sailing at sea a thing of the past. Engine-room complements and the speed of ships had increased and less time was spent at sea. Commissions were only for two or three years. Ship's complements

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had increased, the number of men employed on the upper deck relatively decreased, and the amount of physical energy expended in the open air diminished. But there still remained for the majority of men a good deal of open-air life on deck, in boat pulling and sailing boats.

With the introduction of electric fans and steam heating, the air conditions in ships were generally improving. The pay was still 1s. 8d. per diem, but the comfort of the man afloat and ashore had much improved, and alcoholism and its sequelæ had decreased. The changes in the standard ration made the diet less monotonous and included one pound of vegetables instead of half a pound. Milk and jam were added, and it became possible to take up money in lieu of part of the ration, this enabling the men to purchase more freely from the canteens. With increasing time spent in harbour much more fresh food became available. Consequently, salt beef was abolished in 1905.

To-day a man takes up a reduced standard ration, plus a definite money allowance daily, or he is on the general messing system by which he is fed on the value of the standard ration and receives no money allowance. His pay as able seaman is 4s. a day, and he gets four good meals a day, excluding what he may buy at the canteen. It is, therefore, impossible to get the number of daily calories. With bakeries on board and cold storage, ship's biscuits and salt meat are no longer required.

On certain stations fresh food is not easy to obtain, but on the whole the naval man has a generous and varied diet.

The present-day ships are big, with large complements, and an ever-increasing percentage of men employed below deck in relatively sedentary occupations. The old masts-and-yards sailor is being replaced by highly skilled artisans. Oil fuel is labour saving and the amount of physical work performed per man on the average is less and less. So much work of a skilled nature is now required that less men are available for boat work, and men going ashore and afloat go in steam drifters, with a minimum of exertion. The modern man-of-war may, therefore, be likened to a floating factory, full of men doing skilled work, more or less of a sedentary nature, and eating and sleeping in the factory.

Ventilation and heating have vastly improved so that air conditions are infinitely better than in former years.

The factors influencing metabolism in the three periods may be summarized :—

(1) Food, rough and monotonous, split peas and raisins in lieu of fresh vegetables. Abundance of manual labour in the open air. Cooking arrangements primitive.

(2) Food, less rough and less monotonous. More fresh food. Improved cooking arrangements and less manual labour in the open air.

(3) Diet generous and varied, from general messing system and preserved food from canteens. Still less roughage in food and difficulty in obtaining fresh vegetables abroad. Also fruit and vegetables are expensive at home and men have to be fed at a contract price.

Cooking arrangements are much more elaborate and the modern sailor's diet ashore is comparable with the diet of the skilled artisan town worker. In former days, the diet resembled the old institutional diets in its monotony and cheapness.

Finally, there is the increase of sedentary work on board and with it the change in dress. In the old days, the vast majority of men in the Navy were dressed as sailors, with free ventilation at the neck, the only tight clothing being round the waist. This is an ideal costume, more particularly for men living in spaces which it is difficult to ventilate efficiently. In those days the chief site of boils was round the waist under the old cholera-belt. To-day an increasing percentage (roughly 30 per cent.) of men wear collars, with the result that boils frequently appear at the back of the neck. In the old days the man in the tropics had the same amount

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of fats and protein as the man in the North Sea, whereas now it is possible to vary the requirements for the various stations.

Graph I (fig. 1) shows the average rate for three years in the first period and the present time for diseases of the skin, and diseases of the digestive system on the various stations. It will be seen that in both periods the curves roughly are similar, and that the highest rates are on the China and East Indies stations, with heat, humidity, and the difficulty in obtaining fresh vegetables and fruit.

The Senior Medical Factory Inspector at the Home Office informed me recently that no undue incidence of skin troubles had been noted in the hot and humid cotton-weaving sheds in this country. This fact suggests that climatic conditions are not the primary cause of the common skin infections.

Graph II (fig. 2) shows the same curves for 1921-23 on the various stations, and

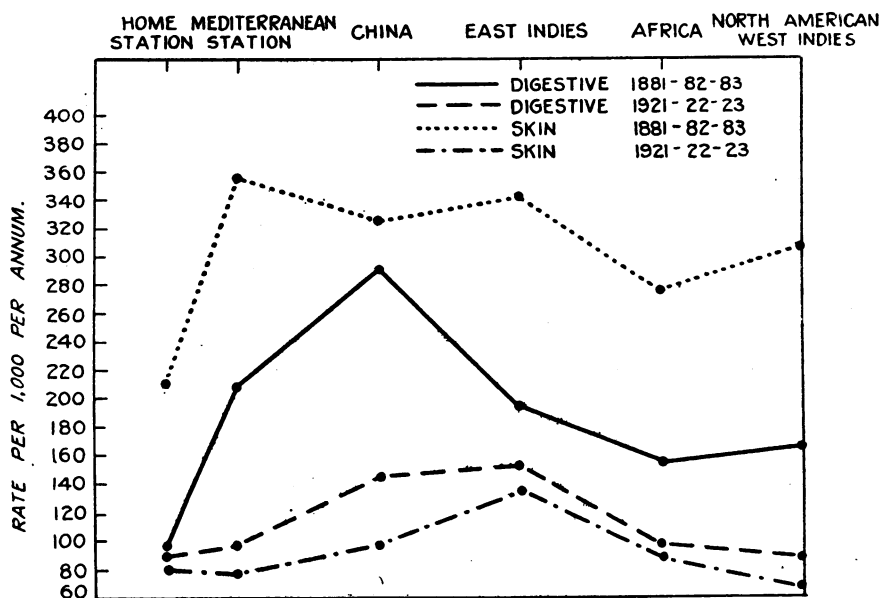


FIG. 1.

also shows the curve for catarrh. In examining nosological returns some years ago I was impressed with the fact that catarrh rates were highest in the summer months and lowest in the coldest months of the year in England. That the incidence of catarrh in the Navy increases with humidity and heat is shown by this graph. The nosological heading "catarrh," is, I believe, peculiar to the Navy and refers mostly to cases of malaise, with no apparent cause, in which the men recover in forty-eight hours with low diet and a purge. Such cases in civil life are sometimes called influenza, and in my opinion are due to increase of intake over output, viz., generous diet and inefficient metabolism. From the above figures and graphs, it would appear that with the elimination of the old monotonous, rough diet of salt meat, ship's biscuit, and lack of fresh food, we have, to a very great extent, lost the diseases peculiar to the Navy in the last century, and now with the introduction of fresh foods, and less

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roughage, our diseases are coming into line with those of the civil population, the urban rather than the rural. This is shown in the increased rates for appendicitis and peptic ulcers in the following table.

TABLE II.—Rate per 1,000 per annum for the Total Force.

Year	Appendicitis	Gastric ulcer	Duodenal ulcer
1914	2.0	0.20	0.10
1915	2.1	0.25	0.13
1921	3.5	0.26	0.21
1922	3.6	0.22	0.26
1923	4.2	0.57	0.35

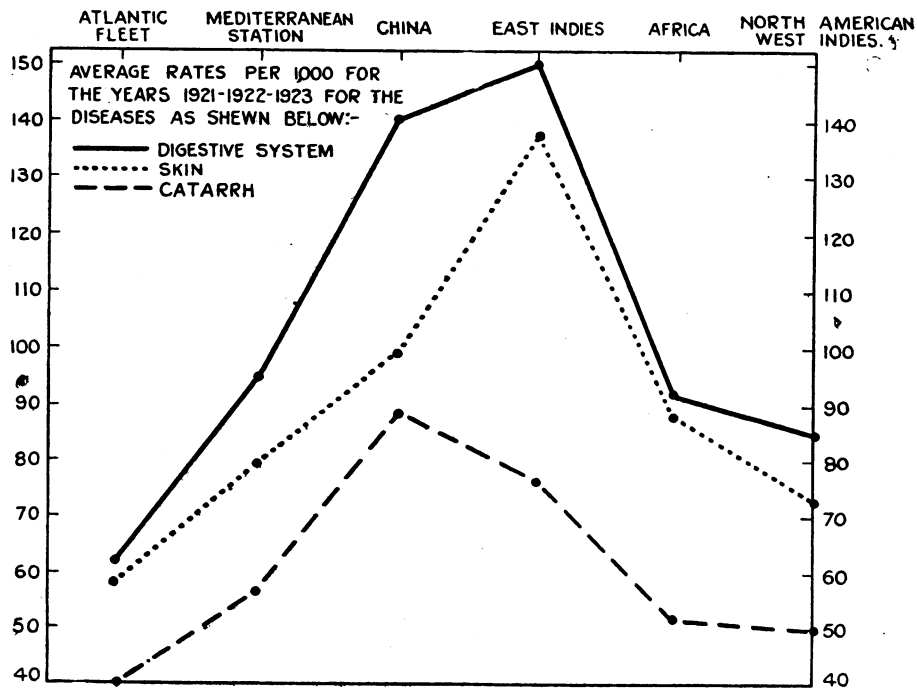


FIG. 2.

These figures are supported by the following figures obtained from the operating room register at Haslar Hospital :

TABLE III.—Figures obtained from the Operation Register at R.N. Hospital, Haslar.

Period of 33 months	Appendix	Gastric and duodenal perforations
1910—1912	171	5 gastric, duodenal nil
1923—1925	320	31 gastric, 5 duodenal

In the first period the average age for appendicitis was 24 years, and in the second 27 years.

In the gastric perforations, the average age has decreased from 32 to 29 years, but with the few cases this is not of much value. The figures show, however, that peptic

ulcers are increasing more rapidly than appendicitis, and also that the rate of perforating ulcers is increasing more rapidly than the rate for ulcers as a whole.

The question at once arises, are the diseases increasing more rapidly in the British Navy than in other communities? Taking the England and Wales male civil population for 1923, age 15 to 45, the mortality rates per 1,000 are: gastric 0·057, duodenal 0·032; and in the Navy the incidence rates for 1923 are: gastric 0·57, duodenal 0·35; suggesting that the relative rates of gastric to duodenal ulcers are much the same in both the civil and naval populations.

The Annual Report of the Surgeon-General of the United States Navy gives the following figures for 1923:

FRESH CASES.					
Ulcer of stomach ...	18	...	Rate per 1,000 ...	0·15	...
„ duodenum...	37	...	„ „ ...	0·31	...
			Operations ...	3	
			„ ...	8	

These figures are interesting in that the incidence of duodenal ulcers is double that of gastric, whereas in the British Navy the case ratio, and, in the British civil male population, the mortality rates are the exact opposite. The incidence of duodenal ulcer in England and Wales is higher than that of gastric ulcer in males of all ages. Another interesting point is, that in 1924, in the U.S. Navy, there were 748 appendices removed, which gives a rate of 6·4 per 1,000. In the American Navy it would appear that the appendix rate is much higher than in our Navy. The peptic ulcer rate is lower and the rate for perforated peptic ulcers is also lower.

I do not know the American sailor's diet, but from the distribution of their fleets it would appear that a much greater proportion of American sailors are in temperate climates than is the case in the British Navy, and, I believe, the American sailor is better paid than ours. These factors suggest more fresh food and better metabolism.

The Registrar-General's mortality-rates as a whole are not of much value in comparing the incidence of diseases, but when the mortality rates are taken at age groups some use may be derived from them. In the past eleven years the civil appendix mortality-rate has only increased from seventy-eight to eighty-three per million males. But from the graph herewith shown (fig. 3), the rate has decreased below the age of 30, and increased above 30. This I believe shows that in the male civil population appendicitis is increasing in middle and old age.

Similarly, in the next graph (fig. 4), showing the mortality-rates from gastric ulcer, males 1906-1910, males 1921-1923, and females 1921-1923, we see that the death-rate is increasing rapidly in males from 30 to 65 years of age, and that the death-rate is double that of the female.

On the supposition that a rural life with open-air work, and simple food, is healthier than a town life, I have worked out the death-rates for male populations in the age-groups 15-25, 25-35, 35-45 years from Registrar-General's returns for the year 1923.

TABLE IV.

	Gastric ulcer			Duodenal ulcer			Appendicitis		
	15-25	25-35	35-45	15-25	25-35	35-45	15-25	25-35	35-45
England and Wales ...	1·6	4·6	12·3	0·97	3·0	6·4	9·6	6·7	6·5
London ...	1·9	4·19	16·0	0·27	3·5	6·6	9·9	4·5	5·5
City boroughs ...	2·03	4·09	13·9	0·83	2·9	7·5	9·1	7·6	5·1
Urban districts ...	1·4	5·1	12·5	1·2	3·4	7·6	11·6	6·8	9·1
Rural districts ...	1·7	4·02	9·8	1·01	1·9	3·7	8·5	6·7	7·1

These figures show that the death-rate from appendicitis and peptic ulcers is lowest in rural districts, and that these rates become relatively lower with increasing age.

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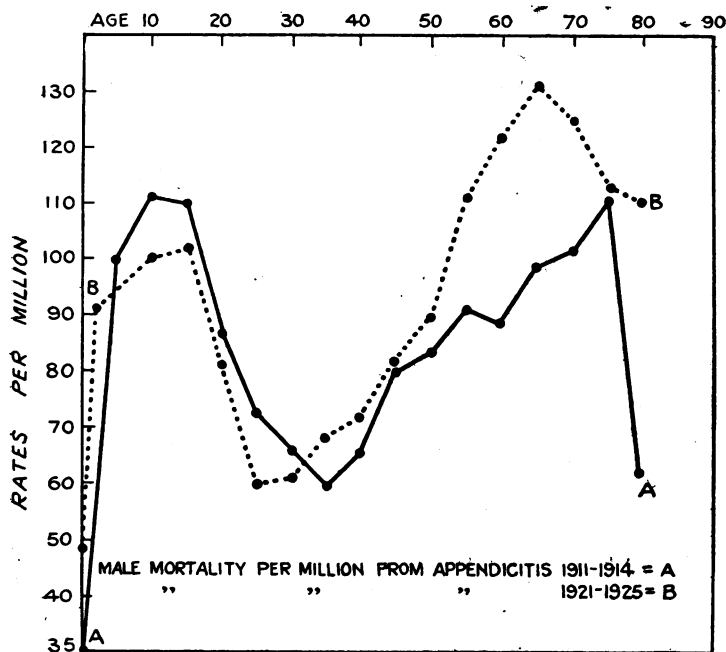


FIG. 3.

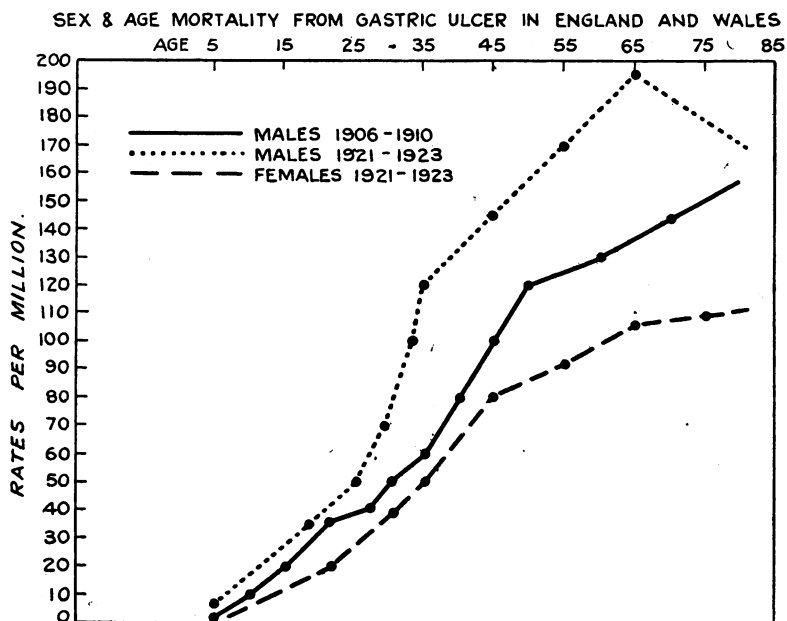


FIG. 4.

It is, I believe, generally accepted that the predisposing and exciting causes of appendicitis are to be found in our modern diet, with its lack of roughage.

The causes of peptic ulcer, however, are still under discussion. As their incidence presumably varies with different occupations, I inquired of the Registrar-General for the occupational mortality-rates, and was informed that such rates are being worked out for the ulcers and appendicitis, but are not yet available. Assuming that the exciting causes are microbic emboli plus gastric acidity, it appears to me that the predisposing causes connected with the nutrition of the mucous membrane of the digestive tract are also of the utmost importance.

The male gastric mortality-rate being double that of the female may be explained to some extent by the modern dress with free ventilation, as suggested in the case of chlorosis.

In the thirty-five cases of perforated ulcer operated upon at Haslar, the incidence amongst men dressed as sailors is roughly half that of men dressed in collars and coats. Also it would appear reasonable to suggest that alcohol, hot sauces and tobacco exercise an influence. The naval man of forty years ago was much more alcoholic than he is to-day, and practically every man chewed tobacco. Therefore the exciting causes appear to have increased in recent years. The source of microbic emboli is said to be some focus of low grade suppuration, as the appendix, gall-bladder, or teeth. The civil male mortality graphs show the rapid rise in later life of both appendix and gastric ulcer rates, both rising to the age of 65 years and then falling, and we know how frequently gall-bladder inflammation and appendicitis are associated with peptic ulcers. The suggestion that the apices of devitalized dental root-canals may provide a focus can to some extent be examined in the Services from records of dental treatment. At the beginning of the century naval medical officers were responsible for dental treatment. Then we had a few civilian dental surgeons attached to depôts and training establishments, who formed the nucleus of the naval dental service. During the Great War 84 temporary dental surgeons were employed who, after the war, were gradually demobilized—leaving 24 permanent dental surgeons in 1921. In 1922 there were 31 dental surgeons; in 1923, 43; and at the present time, 48. With a decreasing personnel, the naval dental service has increased, so that now we have one dental surgeon to every 2,000 men. In the American Navy in 1924 with 154 dental surgeons, the proportion is one to every 750 men, and this rate is considered inadequate.

TABLE V.

		R.N. 1922		R.N. 1923		U.S.N. 1913
Dental surgeons	...	31	...	43	...	154
Complement	...	96,560	...	89,100	...	116,000
Permanent fillings	...	27,269	...	44,089	...	75,877
Extractions	...	17,004	...	19,414	...	23,341
Pulp treatment	...	3,639	...	6,535	...	8,474
Root treatment	...	4,974	...	7,068	...	6,892

The figures available are shown in Table V, and various interpretations may be put upon them.

With the increase in dental staff in the Royal Navy in 1923 it will be seen that root treatments have increased nearly 50 per cent. in 1922, with relatively fewer extractions. This suggests that a few years ago, with fewer dental surgeons and a much larger complement in the Navy, much less root treatment was possible. In the American Navy, with nearly three times the number of dental surgeons to the same number of men, the root treatments are fewer than in our Navy but a greater



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proportion of men receive permanent fillings. This suggests that in the American Navy, with an increased complement of dental surgeons, more teeth can be dealt with in the early stages of decay.

Whatever the causes of peptic ulcer may be, I would submit that the predisposing causes are at least as important as the exciting. For in women with a relatively low rate, we have much the same rates as men for gall-bladder and appendix troubles. Possibly women, as a whole, take more care of their teeth and do not have so much root treatment. The predisposing factor must be greater in men, and from the increase in peptic ulcers in the Navy it would appear that these factors are more marked than in the civil rural population.

If we could discover whether these factors were due to diet, e.g., lack of roughage, to modern cooking, to dental troubles or to inefficient metabolism from men working below decks in ships, something might be done to check the increasing incidence of these acute abdominal troubles. They are serious enough on land with a hospital available but infinitely more difficult to contend with in a ship at sea.

As the general working conditions in the Army and Air Force are very different from those of the Navy, their figures will, I hope, throw more light on the causes of these acute affections of the gastro-intestinal tract. For it is only in the Services that we can get incidence rates and know exactly the conditions under which men live.

*Discussion.*—Surgeon Captain SHAW, R.N., said: Commander Dawe has shown us that whilst the incidence of diseases of the digestive system generally in the Navy has fallen by approximately 100 per cent. during the last forty years, the incidence of three very important diseases of this system, viz., appendicitis and ulcer of the stomach and duodenum, has increased. A most important consideration is: What is the cause of the increase, because diseases of the intestine, largely appendicitis, are now one of the four chief causes of deaths in the Navy?

I am inclined to believe, as Commander Dawe suggests, that the change in the sailor's life from one which included plenty of open air and a considerable amount of exercise, to the present-day conditions under which there are fewer opportunities for exercise and more time is spent between decks, has something to do with the increased incidence of these diseases.

It may be of interest to note, in this connexion, that during the past thirty years, when the incidence of practically all classes of disease in the Navy has fallen markedly, the incidence of malignant disease, which in man affects chiefly the digestive system, has increased. During the years 1900-1909 the average yearly incidence for malignant disease was 0.10 per 1,000; 1910-1914, 0.2; 1915, 1921, 1922 and 1923, 0.21. The highest incidence was in 1915 (0.37). This can be explained, I think, by the increase in the number of older men serving in the Navy following mobilization. As regards the reduction in skin diseases, boils, etc., I think an important factor has been at work here which Commander Dawe omitted to mention when describing the changed conditions of the sailor's environment. During the period he reviews washing facilities have very materially increased, and the cleanliness of the person and clothes which can now be ensured must help very materially in keeping the incidence of skin affections low.

Commander Dawe has referred to the general messing system now in use in some of our ships and establishments. The introduction of this system (first tried out in our first *Dreadnought*) is an important landmark in naval hygiene and represents the latest of the many changes which have been introduced to improve the sailor's diet. It should be noted (Commander Dawe does not make this point sufficiently clear, I think) that in the general mess system the amount of money available per head is the value of the standard ration *plus* the messing allowance. This amount is at present 1s. 5d., and for boys 1s. 6½d., per day.

Major G. D. JAMESON, R.A.M.C., said that Surgeon Commander Dawe had expressed a hope that the experiences in the Army and Air Force would throw some light on the problem. As far as the Army was concerned, the health figures gave little help except that in the main they agreed with the Navy figures. As suggested by Commander Dawe, life in the Army had

not altered so appreciably during the last forty years as it had in the Navy, except for the fact that the soldier was better housed and clothed. As regarded diet, the improvements had been mainly in the direction of a better-balanced and more varied diet than in actual quantity, the caloric value of the diet forty years ago being about 3,000 as compared with the present-day value of 3,110. It was interesting to note the high caloric value of the Navy forty years ago as compared with the Army, and also the present United States Army ration of over 5,000 calories as compared with the British. As regarded actual sickness rates, it was pointed out that although the Army rates per 1,000 were somewhat lower generally than the Navy, the same relative decrease in digestive diseases had taken place in the last forty years, and also that since 1910 there had been a rise in the attack rate of appendicitis and peptic ulcer. As regarded the dental point of view, it was apparently the opinion of Army dental officers that a definite connexion between a man's dental condition and his tendency to peptic ulcer was hard to trace, the incidence of this disease not being appreciably different in young soldiers who had been under a dental officer's care since enlistment and old soldiers who had not had the advantage of skilled dental treatment during the whole of their service. He (the speaker) inclined to the belief that the rise in appendicitis and peptic ulcer must, therefore, be looked for in the present-day diet with its large percentage of chemically prepared and purified foods.

Fleet Surgeon W. E. HOME, R.N., said that perhaps the author ascribed too exclusively the improvement in health he had brought out to the recent improvement in the feeding and conditions of the sailor since 1912. He (Fleet Surgeon Home) had served in the *Galatea* in the Home Fleet in 1901-2, and the average of sickness by the Sunday signals was, "men sick and in hospital, 4 per cent." When he was Senior Medical Officer in the Channel Fleet, in the *Exmouth*, 1905-7, the similar average had fallen to 2, the rate thus being halved. At the time he had thought the improvement was due to the larger cubic space and better ventilation of the newer pattern of ships. He was quite sure that while he was a student and during his early service there were very few cases of appendicitis; it was not that they were merely unrecognized. It was very important in reporting statistics of illnesses and deaths in the Service to state the ages of the patients concerned, and also of the men in the Service generally, which seemed, by recent reports, to be older now than in former years. He directed attention to a paper in the February number of the *Military Surgeon*, by an officer of the U.S. Public Health Service (p. 237), stating that Japanese research workers could produce experimental gastric ulcers by means of diet, and suggesting that tuberculosis depended in some degree on diet, and that the incidence of pulmonary tuberculosis in a community varied inversely with the consumption of milk by the inhabitants.

Lieut.-Col. P. H. HENDERSON, R.A.M.C., said that Surgeon Commander Dawe had done well in drawing attention to certain disabilities which, owing to the increase in their mortality apart from the noticeable increase in their incidence, were attracting much attention in the Services.

Perhaps there had been greater changes in recent years in the environment of the sailor, but there had also been very considerable changes in that of the soldier. Commander Dawe appeared to think that there was perhaps some difference between the environment of the sailor and the soldier which accounted for the increasing incidence and mortality in the Navy from appendicitis, gastric and duodenal ulcers. But he (the speaker) could assure him that while there was a diminution in the incidence of diseases of the digestive system as a whole in the Army, as there was in the Navy in the periods under discussion, there was an increase at any rate in the incidence of appendicitis, gastric and duodenal ulcers in the Army corresponding to that in the Navy. This increased incidence was shared also by civilians and was attributed to the more accurate diagnosis of the present day. This explanation could not be accepted, for whereas life in the Navy had become less strenuous, it was not so in the Army or in civil life. Factors common to all three communities must be sought as an explanation of this increased incidence. Two possible factors were: (1) The artificial nature of modern food—the adulteration of bread was a signal instance; (2) the extraordinary increase in cigarette smoking. He did not overlook the fact which Surgeon Commander Dawe pointed out, namely, that in the Navy tobacco chewing was formerly almost a universal habit, but in his opinion chewers did not swallow the tobacco juice; they spat it out, whereas cigarette smokers freely inhaled the smoke and with it the nicotine.

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This had an important influence in disorganizing the sympathetic and vagus mechanism so intimately concerned in digestion.

In regard to boils and other septic skin conditions, he (the speaker) used to search for a possible cause in the shortage of vitamins owing to lack of green vegetables or faulty cooking, but he had been unable to trace any definite connexion between the two. In the Army these conditions were most prevalent in humid, hot stations with little air movement, like West Africa and Jamaica, where the troops were frequently bitten by mosquitoes, and in one or two home stations in summer, where the men got hot and dirty grooming horses, etc. He agreed with Surgeon Captain Shaw that the actual cause of these boils and skin complaints was the want of hot water and soap for thoroughly cleansing the skin under these hot, humid conditions.

Surgeon Commander DAWE, in reply to Group Captain Cooper, said that owing to the benefits derived from school dental service recruits joining the Navy were dentally more fit than they used to be. In reply to Surgeon Captain Shaw, who associated the great decrease in skin troubles in the Navy with the much improved personal washing arrangements in recent years, he said he considered that this was not the primary factor, as young officers in the Navy, who could not be accused of lack of cleanliness, not uncommonly developed boils at the back of the neck. He was pleased to hear that the Navy was no worse off than the Army in the incidence of appendicitis and peptic ulcers. The increase in the Navy in appendicitis and gastric and duodenal ulcers was a matter of the utmost concern to naval medical officers, for it followed that in a battleship with a complement of 1,000 or more, in the course of a year's cruise there was the probability of four cases of "acute abdomen" occurring from appendicitis or peptic ulcers. In this connexion he was glad to hear the question of cigarette smoking raised, as he firmly believed it was an important factor in the incidence of peptic ulcers.